



Biomass Taskforce

Issue 2

October 1997

Third Biomass Conference of the Americas

The Australian Biomass Taskforce was represented at the Third Biomass Conference of the Americas by Dr Stephen Schuck, the Biomass Taskforce Manager. The conference was held in Montreal Canada from 24-28 August. This major international conference was attended by 400 delegates from 31 countries.

The technical program was delivered in five parallel sessions in 219 papers. The session topics were:

- Resource Base (three sessions)
- Environmental Impact and Sustainability
- Heat and Power – Fundamentals
- Heat and Power – Gasification I
- Heat and Power – Combustion
- Heat and Power – Gasification II
- Heat and Power
- Pyrolysis and Bio-Oils
- Chemicals and Materials (two sessions)
- Biofuels (two sessions)
- Anaerobic Digestion
- Systems Integration (three sessions)
- Economics and Business (two sessions)

The sessions were accompanied by interactive cluster sessions. There was also an exhibition as part of the conference. The opportunity was provided to participate on two technical tours.

Visit to Pyrovac, Sillery (Quebec City)

Pyrovac has developed vacuum pyrolysis technology for forestry and energy crop feedstocks. The process leads to the production of primary oils from which the company hopes to extract, after purification, fine chemicals such as phenolics, carboxylic acids, food fragrances and pharmaceutical compounds. These products have a high commercial value. The wood charcoal produced can be transformed into activated charcoal which is used for waste water and air treatment. Byproduct oil and charcoal from the process, as well as the gas can then be burned in cogeneration applications. The technology is at an advanced laboratory stage. A commercialisation company, Pyrovac International, Inc has been formed to market this technology internationally.

A tour of the plant showed the plant in operation as well as samples of product oils from a variety of feedstocks.

Tour to Burlington, Vermont McNeil Power Station and the Batelle/FERCO Gasifier

This 50 MWe stoker grate, wood chip fired power station has been in operation since mid 1984. The capital cost was US \$67 million. Most of the wood chips come from low quality trees and harvest residues. The remaining wood is sourced from local sawmills, and from processed urban wood wastes. Foresters employed by the power station participate in the harvest of wood to ensure only low quality timber is used and clear felling is limited to 25 acres. The wood is chipped in the forest and transported by rail or trailer trucks to the power station. The fuel cost is in the range of US \$12 to \$20 per ton. The wood chip pile is well

managed to ensure a first in- first out usage to prevent spontaneous combustion and decomposition.

In 1989 gas was added to the power station to increase its capacity. At full load the plant consumes 76 tons of chips per hour. The plant is equipped with an electrostatic precipitator and cyclones to limit particulates. The ash is mixed with limestone and is marketed as a soil conditioner and for road base.

Also on site adjacent to the power plant is the newly constructed Batelle/FERCO gasifier. The 200 t/day gasifier cost US \$14 million to construct and uses much of the infrastructure of the power station. It will initially pipe the producer gas into the power station's furnace. At a later stage a gas turbine will be provided.

The conference Proceedings (2000 pages) are being sold through Elsevier publishers. Details through URL <http://www.nrel.gov/bioam> or contact Steve Schuck.

The Biomass Taskforce and the Electricity Supply Association of Australia provided financial support for attendance at the conference.

IEA Bioenergy

IEA Bioenergy is an international collaborative agreement. It was set up in 1978 by the International Energy Agency (IEA) to improve international co-operation and information exchange between national bioenergy (Research, Development & Demonstration – R,D&D) programs. IEA Bioenergy aims to realise the use of environmentally sound and cost-competitive bioenergy on a sustainable basis, to provide a substantial contribution to meeting future energy demands.

Currently there are four active large tasks within IEA Bioenergy. These are:

Task XII	Biomass production, harvesting and supply
Task XIII	Biomass utilisation
Task XIV	Energy Recovery from Municipal Solid Waste
Task XV	Greenhouse balances of bioenergy systems

Within each Task there are a number of activities. These Tasks will be completed at the end of 1997.

A new program with a new set of about 10-12 smaller, better focused Tasks for the period 1998-2000 will be adopted at the upcoming IEA Bioenergy Executive Committee meeting in Rome on 20-21 November 1997. Budgets for each Task need to be refined. This will depend on how many countries participate in each new Task.

The proposed Tasks, level of anticipated participation and expected cost per participating country are shown in the following Table:

In addition to contribution to Tasks (which depends on the degree of participation), each participating country pays an equal share for administration at the Executive Committee level. In 1997 this was slightly less than US\$5000 per country. Administration and fund handling for 1998 is expected to be slightly higher than this for 1998.

Interest in participating in the IEA Bioenergy program will be considered at the Biomass Taskforce Symposium, to be held in Canberra on 21 October. Members of the IEA

Task	No. of Participating Countries	Est Cost per Participant US\$
1. Short Rotation Crops	7	10,000
2. Conventional Forestry	8	16,500
3. Environmental Issues	-	-
4. Combustion	12	7,085
5. Gasification	10	7,500
6. Co-firing	3	-
7. Pyrolysis	2	9,600
8. Technoeconomic Analysis	2	31,250
9. MSW Thermal Conversion	8	9,575
10. MSW Biological Conversion	4	18,550
11. MSW Integrated Waste Management	4	28,325
12. Greenhouse Gas Balance	7	11,900
13. Liquid Biofuels	7	20,000
14. Biodiesel	-	-
15. Bioethanol	2	31,500

It is expected 6. *Co-firing* and 4. *Combustion* will be merged.

Bioenergy Executive Committee will also be attending the IEA Bioenergy Task XII End-of-Task meeting in Canberra from March 17-20 1998, where Australian participation will be furthered discussed.

Biomass Symposium

A one day symposium on biomass energy will be held at the Forestry House Conference Centre in Canberra on 21st October 1997. The objective of this symposium is to bring together industry and government representatives with an interest in all aspects of biomass and biomass energy. The morning session will provide an update on opportunities and the state of the industry, with presentations by project developers and leading researchers. Time at the afternoon session will be set aside to gauge interest in participating in other Biomass Taskforce activities, including the move towards participating in the IEA Bioenergy program.

Proceedings of the symposium will be issued. A nominal registration \$85 fee is being charged to cover costs, issue of the proceedings and future communication costs.

For details of the symposium contact Dr Stephen Schuck on phone/fax 02-9416 9246 or email Steve.Schuck@bigpond.com.

Biomass on the Internet

The Internet provides a valuable source of information on biomass. Below are some Internet addresses to supplement the addresses given in Issue 1 of the Biomass Taskforce newsletter:

Search Engine for Renewables (24 sites)

<http://www2.vivid.net/~ses/search.html>

European Energy Crops Internetwork

<http://btg.ct.utwente.nl/eeci>

Caddet (IEA)

<http://www.caddet.co.uk/>

<http://www.caddet.co.uk/regagfor.htm> (summary articles relating to forestry)

<http://www.caddet.co.uk/regmunic/htm> (summary articles relating to MSW)
 Joanneum research establishment (Austria)
<http://www.joanneum.ac.at/main.htm>
 US Dept of Energy
<http://www.eia.doe.gov/fuelrenewable.html>
 US Dept of Energy. Energy Efficiency and Renewable Energy Network
<http://www.eren.doe.gov/biopower.html>
<http://www.eren.doe.gov/photolibrary.html>
<http://www.eren.doe.gov/agriculture>
<http://www.eren.doe.gov/opportunities>
 State of California
<http://www.ca.gov/energy/education/biomass.html>
 James and James
<http://www.jxj.com/usr/etsu/entry/308435.html>
 Business directory
<http://www.vivid.net/corp/commonpurpose/biomass/html>
 Biomass Businesses in the World
<http://www.mtt.com/theSource/renewableEnergy/businesses/byP/biomass/>
 US Dept of Energy. Alternative Fuels Data Centre
<http://afdc.nrel.gov>
 Biofuels Information Network
<http://www.esd.ornl.gov/bfdp>
 Renewable energy in France
<http://www.edf.fr/html/en/mag/renouv/4.htm>
 PyNE
<http://www.ceac.aston.ac.uk/PyNE>
 Biomass Information Sources on Internet
<http://ensolar.ee.tu-berlin.de/iscb/biomass/bio2.html>
 Non-Food Agro-Industrial Research Information Dissemination Network
<http://www.cplscientific.co.uk/nf.airid/>

Correction: An address given in Issue 1 should have read:
 NSW Sustainable Energy Development Authority
<http://www.seda.nsw.gov.au>

Bioenergy E-mail Lists

The Center for Renewable Energy & Sustainable Technologies (CREST) hosts five mailing lists for industry, academia and government to discuss biomass production and conversion to energy. Subscribers to the lists are engaged in the research and commercial production of biomass crops and fuels; the conversion of biomass in commercial operating plants; the construction and testing of commercial –scale pilot facilities for combustion, gasification and anaerobic digestion; testing and analysis of environmental impacts for bioenergy; and promotion and planning of future bioenergy resources. There is no fee to subscribe to the lists.

The lists are:

1. Bioenergy (bioenergy)
2. Gasification (gasification)
3. Anaerobic Digestion (digestion)
4. Stoves (stoves)
5. Bioconversion (bioconversion).

To subscribe, send an E-mail message to MAJORDOMO@CREST.ORG with the message:

SUBSCRIBE list-name YOUR E-MAIL ADDRESS
(eg. Subscribe digestion steve.schuck@bigpond.com).

To leave a list send the message:

UNSUBSCRIBE list-name YOUR E-MAIL ADDRESS to the same address.

For further information contact CREST at info@crest.org or Stephen Schuck.

Report Review

Report Title: *The Commercial Co-Firing of RTP™ Bio-Oil at the Manitowoc Public Utilities Power Generating Station*

Author: *Ray Sturl*, Manitowoc Public Utilities, Manitowoc, Wisconsin, USA.

Date of Report: *June 1997*

Manitowoc Public Utilities (MPU) conducted a commercial trial of co-firing their Number 6 unit, a 20 MWe coal-fired stoker boiler with a wood derived bio-oil produced by Rapid Thermal Processing (RTP™), a fast pyrolysis process (pyrolysis is a process in which biomass is heated in the absence of oxygen). The trial demonstrated the use of a renewable energy fuel source, which has essentially no sulphur content.

The bio-oil used was produced from mixed hardwood at the Red Arrow Products Company in Manitowoc. The 8 cm sized wood particles are delivered to this facility with a moisture content of about 50 percent in tractor trailers. The wood is dried to about 8 percent moisture content in a rotary drum dryer and then transferred to a central storage area consisting of overhead bins. From the bins, it is directed to the fast pyrolysis plant. The RTP™ unit has a nominal capacity of 50 t/d, which is equivalent to 25 dried t/d.

The dried wood is rapidly heated with a hot particulate heat carrier to a temperature of about 510 degrees C. Conversion is conducted at atmospheric pressure and processing time is about 0.5 seconds. The wood is 'flash' vaporised, and the resulting vapours are cooled and recovered as bio-oil. The resulting bio-oil is pourable and pumpable at room temperature. The yield is 70-75 percent by weight of the dried wood feedstock. At the processing plant a portion of the bio-oil is extracted for value added chemicals, and it is the residual bio-oil which is co-fired in the power plant.

The residual bio-oil has the following properties:

Fuel Property	Residual Bio-oil value
Moisture content (wt%)	17.7 – 22.5
Ash (wt%)	0.01- 0.18
Specific Gravity	1.20
Higher heating value (MJ/kg)	17.8
Elemental (wt%, MAF)	
Carbon	56.22 - 59.43
Hydrogen	5.36 – 6.14
Nitrogen	0.26 – 0.37
Sulfur	<0.01 - < 0.05
Oxygen	20.36-34.12

